

Surgery of the Genitalia in Children*

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I shall confine my paper to the external male genitalia. Most of the problems that we have dealt with have been congenital from simple meatal strictures to more severe, although not necessarily more serious, situations. In the last 18 years, I have worked closely with Dr. Charles Horton, and much of this report represents our joint efforts.

We sometimes see exotic traumatic lesions. One little boy, who was rather dull mentally, was the victim of a couple of "flim-flam men." Two of his companions convinced him that they should all put rubber bands on their penises, but he was the only one who did it. Three days passed before his parents brought him to the Emergency Room for treatment. On examination the rubber band was discovered and immediately removed after which he was admitted to the hospital. Our group was consulted because the penis failed to improve. Surgical exploration revealed a restrictive fibrotic band of dead skin and subcutaneous tissue beneath the area where the rubber band had been. We excised this band and debrided the penis. Healing was slow but satisfactory.

Hypospadias is the most common congenital lesion we have encountered. In this condition the urethral meatus is located more proximally than normal on the ventral surface of the penis and is accompanied by a ventral curvature called chordee. Because of an increased incidence of upper urinary tract anomalies associated with hypospadias, we do an intravenous pyelogram on all of these patients. In the more severe conditions with the meatus in the region of the scrotum or perineum, there are often hypoplasia and undescended testes. We evaluate

such patients with sex chromatin and chromosome studies as their sex may not be obvious from external examination.

We have treated several patients with perineal hypospadias who actually were male pseudohermaphrodites with internal female organs and undescended testes. These patients require abdominal exploration; and testes, which if present and cannot be brought down, should be removed. We recently saw a male pseudohermaphrodite who had had a testis biopsy 25–30 years prior to our seeing him, and the testis had been left *in situ*. A large mass occupying the pelvis which proved to be seminoma had produced a foot drop by nerve compression. This mass completely disappeared on radiation therapy, and at second exploration we could find nothing except necrotic tissue. Hopefully he has been cured. Recent evidence indicates that the undescended testis in male pseudohermaphrodites is more prone to malignancy than the ordinary undescended testis.

Hypospadias represents the cessation of normal development of the male external genitalia. At one point in embryologic development, the external genitalia of the male and female are identical. The interstitial cells of the developing testes are quite prominent and furnish a hormone that causes male development. Hypospadias is caused by premature cessation of the formation of this hormone which results in an incompletely formed penis. We have repaired all types of hypospadias with only one stage of surgery including chordee without hypospadias and glanular, distal penile, mid-penile, scrotal and perineal locations. When chordee is present, surgery is necessary regardless of the location of the urethral meatus.

The normal urethra is surrounded by corpus spongiosum, Buck's fascia, dartos fascia and skin. In hypospadias, these structures are missing; the mesenchyme, distal to the urethral meatus which

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normally forms them, undergoes fibrous dysplasia and forms a band of tissue which must be removed in order to release the chordee and straighten the penis; otherwise chordee is likely to recur.

We usually repair chordee at age two; but if the penis is small, we sometimes wait until age three or four. Hormone therapy enlarges the penis but also makes the fibrous tissue layers more prominent and tougher, rendering surgery more difficult. Surgical repair is more difficult on older patients whose structures have become more prominent due to natural hormone production.

It is important for mothers to stay with their children during hospitalization. Dr. Panayotis Kelalis recently reported on a preliminary study that he and psychiatrists at the Mayo Clinic have done on the psychological aspects of surgery on the genitalia. They feel that operation on the genitalia when the child is under the age of two or three is not nearly so important to the child's psyche as is separation from his mother.

In over 250 total cases of hypospadias, we have found 22 patients with chordee without hypospadias including three different types. In class I, just the epithelium has grown together leaving an epithelial-lined urethra covered by skin with fibrous tissue lying beneath it causing chordee. In class II, there has been further development of the mesenchyme around the urethra with formation of the urethra in the corpus spongiosum with fibrous tissue causing chordee lying beneath and lateral to it. In class III, Buck's fascia has also formed around the corpus spongiosum. The fibrous tissue causing the chordee is only the deficient dartos layer, and correction does not require dissection beneath Buck's fascia. In chordee without hypospadias there is a typically sharp bend; the prepuce is complete and the meatus is located in the glans. The median raphe deviates to the side ending in a structure resembling a knuckle lying on the top of the penis. Chordee without hypospadias can also be corrected without severing the urethra. A longitudinal incision should be made with careful dissection, and fibrous tissue removed to straighten the penis. The urethra will stretch to fit. One of the most distressing patients with whom we have dealt in the recent past is a young man of 19. Seventeen years ago he underwent his first operation for chordee without hypospadias. When we saw him four years ago after 10 operations he still had chordee, but it was penoscrotal junction hypospadias with

a lot of scar tissue. We have completed his surgery in four additional stages.

We have done dorsal meatotomy on patients who have a very distal strictured urethral meatus and no chordee. We raise a V-flap of glans tissue, make a dorsal incision in the urethral meatus and insert the flap of tissue in order to enlarge the opening in a distal direction. We then proceed with circumcision.

The glanular V-flap is now used in all of our hypospadias repairs. Dissection is carried out beneath the glans and along the surface of the corpora cavernosa. There is a good cleavage plane between the glans and the corpora. The tissue which causes the chordee actually inserts on the undersurface of the glans and not on the corpora cavernosa. The chordee will not be completely corrected if any tissue is left to keep the cap of the glans tilted ventrally. An anteriorly based flap is taken from the midline, freed up, and sewn back on to the corpora. Construction of the urethra is based on this allowing the urethral meatus to be placed at the tip of the glans where it should be. Before we developed the glanular V-flap, we used a tube graft for all urethral repairs. Now when the flap reaches the urethra after dissection is complete, we use what we call a "flip-flap" to complete the urethra. The penis is circumcised and the V-flap outlined on the glans. Tissue causing the chordee is removed, straightening the penis. A proximal flap based on the urethral meatus is outlined, incised, elevated and left attached to the urethra. After the glans has developed, an incision is made in the dorsal surface of the urethra. The urethra and flip-flap are anastomosed to the V-flap of glans. Lateral wings of glans are then brought around and closed, placing the meatus at the tip of the penis. The prepuce is used to cover the ventral part of the penis with skin. If the glanular V-flap will not meet the urethra, a distal portion of the prepuce is used to make a skin graft tube, which is anastomosed proximally to the urethra and distally to the skin flap, to extend the urethra to the tip. The rest of the prepuce will be adequate then for penile coverage.

In repair of perineal hypospadias, we usually will find a good groove of hairless skin between the two portions of the cleft scrotum which we utilize as a Tirsch-Duplay type of tube to bring the urethra from the meatus to the penoscrotal junction. We make a tube from the distal portion of the prepuce

and join it to the Tirsch-Duplay tube. The distal end of this tube is then anastomosed to the glanular V-flap to complete the procedure.

Urine must be diverted. A urethrostomy tube drains better than a suprapubic tube; however, if the urethral meatus is far posterior, we use a suprapubic tube. Red rubber tubes are softer and have a better consistency than plastic tubes. Diversion is continued for 10 days, and stinting tubes are left in for seven days.

We have performed over 250 hypospadias op-

erations. Seventy-five percent of these are complete after one stage of surgery. Most of our complications are small urethrocutaneous fistulae which require further surgical repair. We are still developing our technique and changing our operation to improve the results. Each case requires individual consideration, and the technique must be adapted to the patient. All surgeons doing this type of work must be familiar with all the types of repair as some facet of another surgical procedure may be just what is needed to solve a difficult problem.